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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,748	09/11/2003	Manabu Nakamura	031140	3468
38834	7590	11/18/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			SMITH, BRADLEY	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/659,748

Applicant(s)

NAKAMURA ET AL.

Examiner

Bradley K. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 26 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: search notes.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 6, 8, 9, 12, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Misium et al. (US Patent 6,261,973) in view of Wong (US Patent 5,423,944). Misium et al. disclose forming a first insulation film on the surface of the substrate then forming a second dielectric film by low temperature processing. With regards to claims 2 and 4, the second dielectric film is formed via plasma nitridation (see title). With regards to claims 9 and 16, Misium et al. disclose performing the plasma nitridation below 650 degrees C (see column 2 lines 35-40). However Misium fails to disclose the formation of the first dielectric layer by using a strong acid. Whereas Wong disclose forming the oxide via acidic solution. With regards to claims 6 and 12, Misium disclose the use of nitric acid (see column 1 lines 20-25). With regards to claim 8 and 14, Misium disclose the use of ozone in an acidic solution (see column 2 lines 50-65). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Misium and Wong because the oxidizing agents such as nitric acid help remove defects (see Wong column 1 lines 20-25).

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3. Claims 1, 2, 3, 5, 11, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al (US Patent 5,412,246). Wong disclose forming a first insulation film using a strong acid solution on the face of the substrate. However Wong fails to disclose forming a second insulation film by low temperature processing. Whereas Dobuzinsky et al. disclose the formation of a second dielectric layer using low temperature processing. With regards to claims 2 and 3, Dobuzinsky et al. disclose using a low temperature oxidation plasma (see title). With regards to claim 5, 11, 18 and 19, Dobuzinsky et al. disclose forming an ONO film (see column 2 lines 55-65). The ONO film can act as a gate insulation film. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wong and Dobuzinsky et al. because the oxidizing agents such as nitric acid help remove defects (see Wong column 1 lines 20-25).

4. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al (US Patent 5,412,246). as applied to claim 3 above, and further in view of Misium et al. (US Patent 6,261,973). Wong and Dobuzinsky et al disclose the forming of two insulation layers. However they fail to teach the use of nitric acid and an ozone containing solution (see above).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wong and Dobuzinsky et al in view of Misium et al. because the oxidizing agents such as nitric acid help remove defects (see Wong column 1 lines 20-25).

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Misium et al. (US Patent 6,261,973) in view of Wong (US Patent 5,423,944). Misium et al. and Wong et al. discloses the claimed invention except for the first insulation film has a film thickness of 1nm or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make an oxide film greater than one nanometer, because if the dielectric film were less than one nanometer it would lose its dielectric properties because if the dielectric film were less than one nanometer it would lose its dielectric properties. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Misium et al. (US Patent 6,261,973) in view of Wong (US Patent 5,423,944) as applied to claim 6 above, and further in view of the knowledge of one skill in the art. Misium et al. disclose forming a dielectric by plasma Wong disclose forming the oxide via acidic solution. However they fail to teach the nitric acid solution is above 70 deg C. Misium and Wong disclose the claimed invention except for heating the nitric acid solution above 70 deg C. It would have been obvious to one of ordinary skill in the art at the time the invention was made to heating the nitric acid solution above 70 deg C, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the

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optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. Furthermore heating the acid above 70 deg C would enable the acid to remove more defects effectively.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al (US Patent 5,412,246). Wong disclose forming a first insulation film using a strong acid solution on the face of the substrate. However Wong fails to disclose forming a second insulation film by low temperature processing after a fixed period of time. Whereas Dobuzinsky et al. disclose the formation of a second dielectric layer using low temperature processing after a fixed period of time, and then leaving the second dielectric layer for a fixed period of time. The examiner asserts that since the Dobuzinsky et al. forms the nitride after the oxide is formed inherently there is a fixed period of time and the nitride is left for a fixed period (otherwise distinct layer of silicon oxide and silicon nitride would not have been formed as shown in figure 5f). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wong and Dobuzinsky et al in view of because the oxidizing agents such as nitric acid help remove defects (see Wong column 1 lines 20-25).

### ***Response to Arguments***

7. Applicant's arguments filed 9/23/05 have been fully considered but they are not persuasive. In response to applicant's argument that neither Misium nor Wong teaches the importance of combining each of the each of them with oxidation by using a strong

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acid solution, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hisatomi et al. (US Patent 5,714,399) disclose a gate insulation film formed of ONO.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

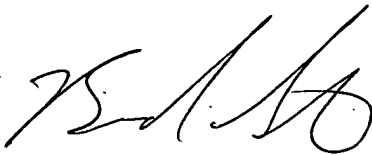
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bradley K. Smith whose telephone number is (571) 272-1884. The examiner can normally be reached on 10-6 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**BRADLEY K. SMITH**  
**PRIMARY EXAMINER**